



Cooperation and Interconnection of Enterprise Process Services

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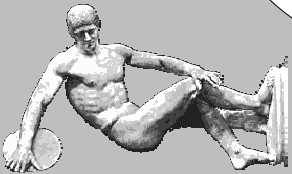
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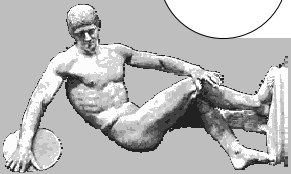
Cooperation and Interconnection of Enterprise Process Services

K. Băina

ECOO Team – LORIA

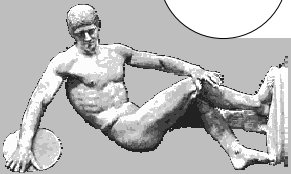
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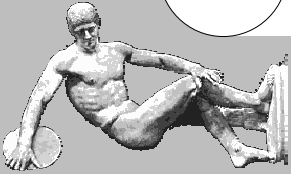
Outlines

- Introduction
- Process Interconnection Related Works
- A Generic Process Service Interconnection Model
- Model implementation in our CSCW plate-form DISCOBOLE
- Conclusion and Perspectives



Introduction

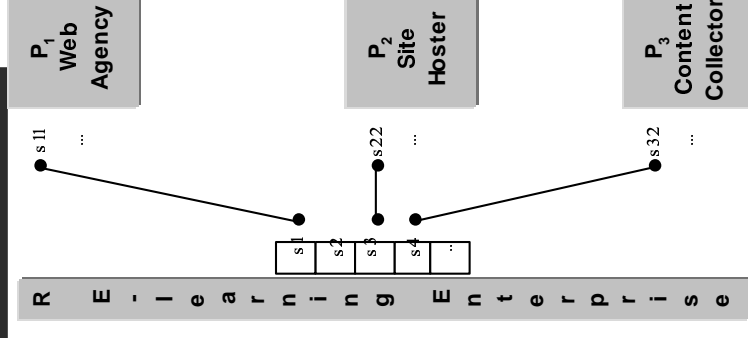
- Enterprises Need
 - capitalising existing partnerships :
 - intensify and strength exchanges with strategic partners over the world
 - optimising exchanges (faster/cheaper) by interconnecting applications :
 - Knowledge Databases, Data Warehouses,
 - ERPs, SCMs, Workflows,...

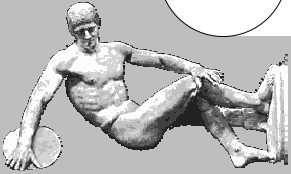


Introduction

● E-learning Partnership Enterprises

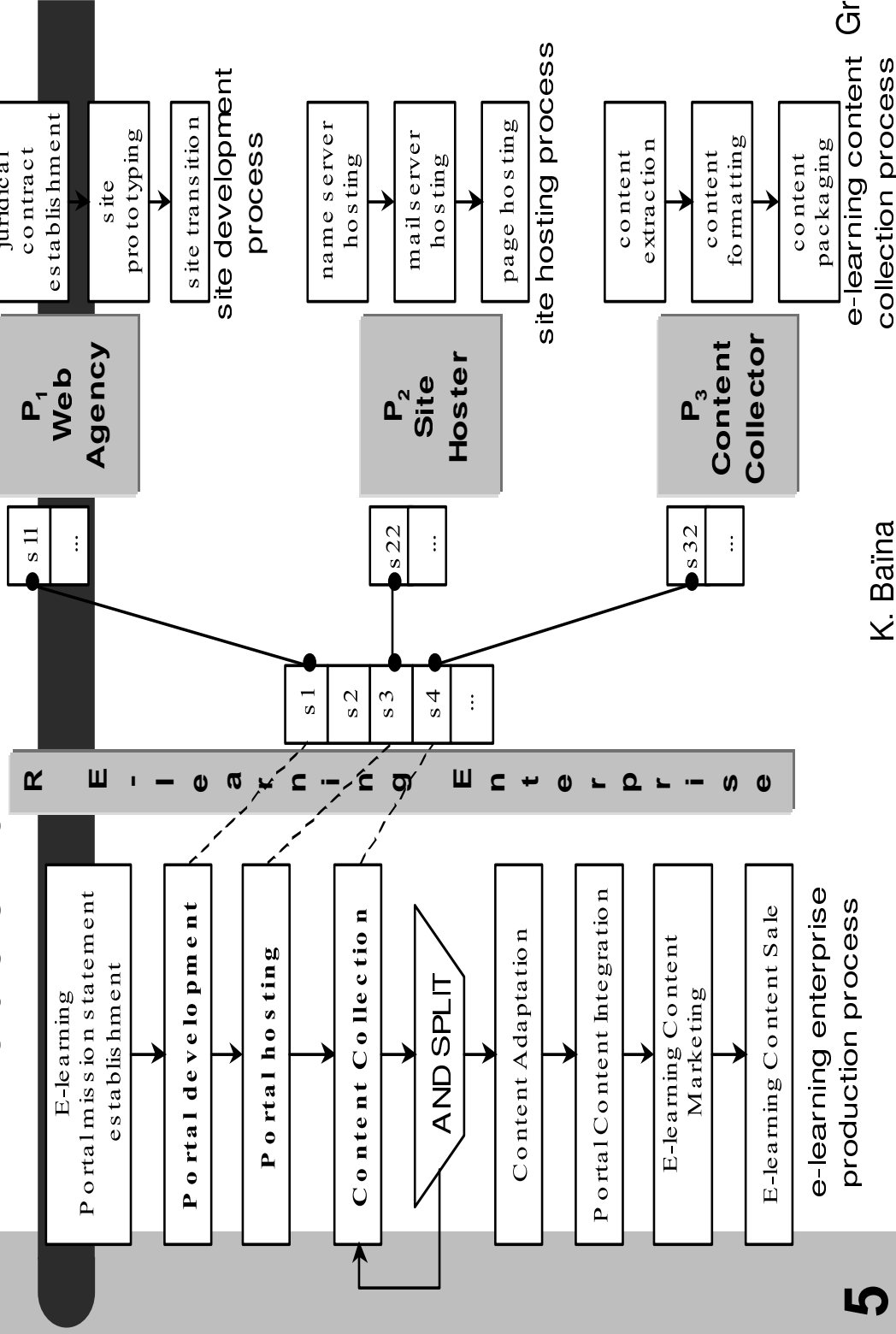
- Partnership Actors :
 - R : E-learning enterprise,
 - P1 : Web agency,
 - P2 : Site hoster,
 - P3 : E-learning Content Collector.
- Partnership Purpose :
 - to product e-learning courses.
- Partnership Rule :
 - each actor offer services related to its own business core.

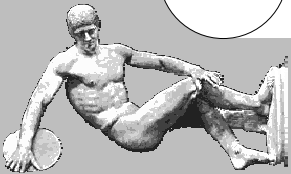




- I. Introduction
- II. State of the art
- III. Model
 - A. Visibility
 - B. Dynamics
- IV. Implementation
- V. Perspectives

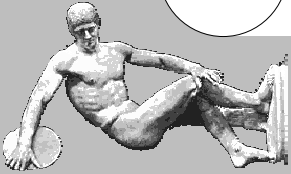
Introduction





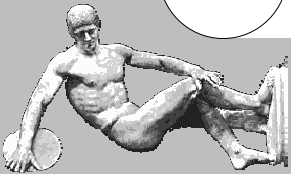
Related Works

- Workflow Management Systems :
 - based on heterogeneous BPDs (Business Process Definition Language)
 - do not deal with inter-enterprise cooperation
 - no process semantics support
 - process instances handled as simple graph objects (node = activity and directed edge = control flow).
 - monolithic
 - process instances depend on the workflow engine (encapsulated black boxes).



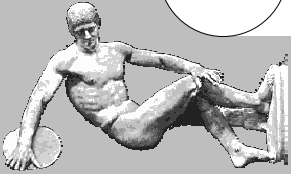
Related Works

- Workflow Interconnection Models and Solutions
 - Models
 - Data exchange protocols,
 - Message based communication,
 - Synchronisation mechanisms....
 - Web Services
 - SOAP, Biztalk, e-speak, .Net, J2EE,...
 - Normalisations
 - SWAP/WebDav (dead RFC drafts),
 - WfMC I4 (interoperability paradigms, Wf-XML/(HTTP, MIME) I2 mapping),
 - OMG (CORBA services),



A generic process service interconnection Model

- Service centred Approach
 - A process service “design pattern” is as a process adapter/proxy handling :
 - functional process **access points** (Methods, Events, Data),
 - and **rights** on them (Visibility Contract),
 - with a layer of process **semantics** (Profile, Distance, Matching and Neighbourhood operators).
- A two facets based Model
 - **Visibility** : interconnection Privacy/Security/Marketing
 - **Dynamics** : interconnection parameters run time decision



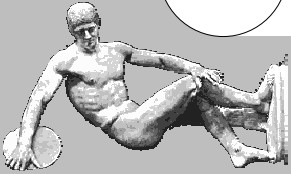
Visibility

● **Semantic Visibility**

- handling elements to classify and explore services

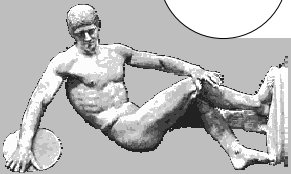
● **Functional Visibility**

- handling Resources of the service



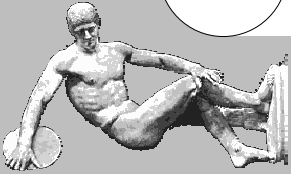
Semantic Visibility

- Process Service Category,
- Process Service Profile with
 - Process Service Distance measurements,
 - Process Service Matching Predicate,
 - Process Service Neighbourhood Computing.



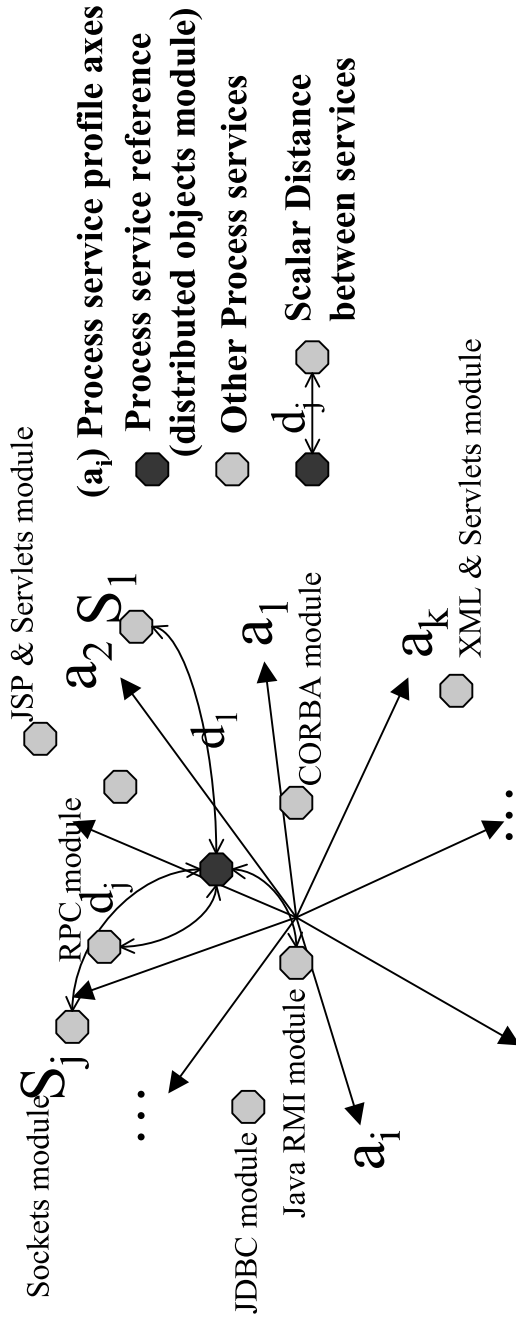
Semantic Visibility

- Process Service Category : an object classification,
- Process Service Profile : a set of significant typed attributes
 - Process Service Distance measurements : a norm operator,
 - Process Service Matching Predicate : an class equivalence operator,
 - Process Service Neighbourhood Computing : a thin class equivalence operator.

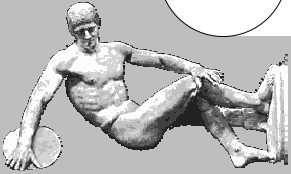


Semantic Visibility

- A Category and Profile based Scalar Distance
(global measure to the whole service profile)

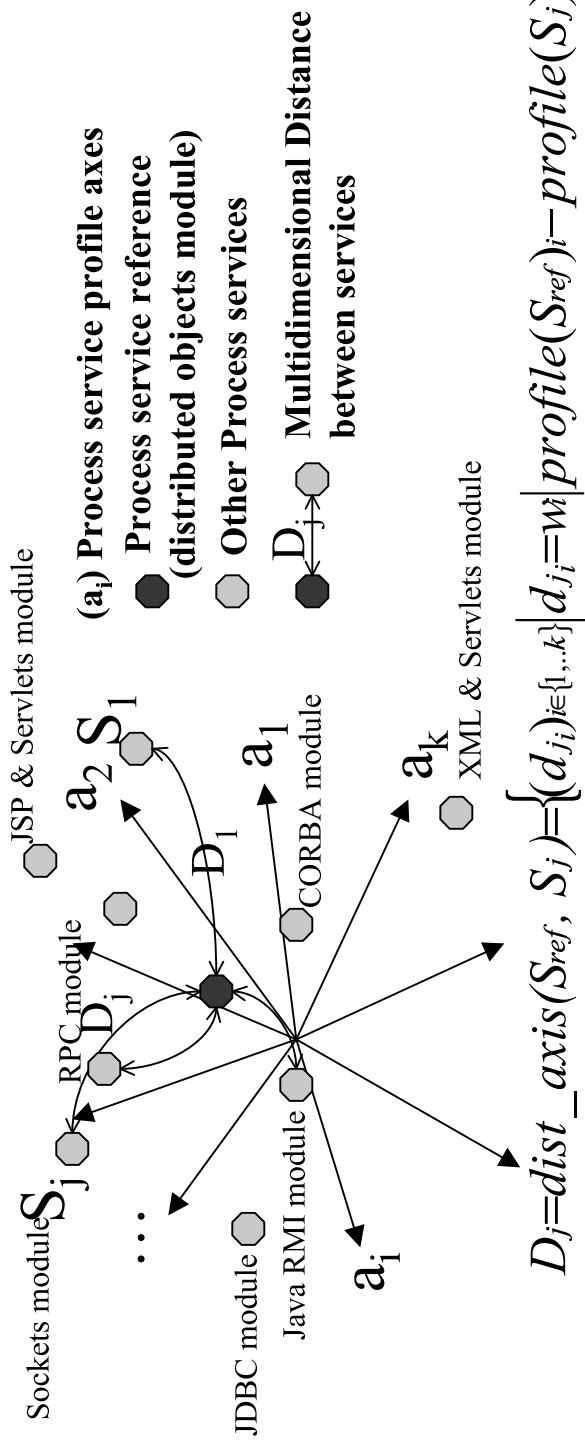


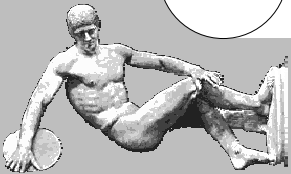
$$d_j = \text{dist}_n(S_{ref}, S_j) = \sqrt[n]{\sum_{i=1}^n w_i |profile(S_{ref})_i - profile(S_j)_i|^n}$$



Semantic Visibility

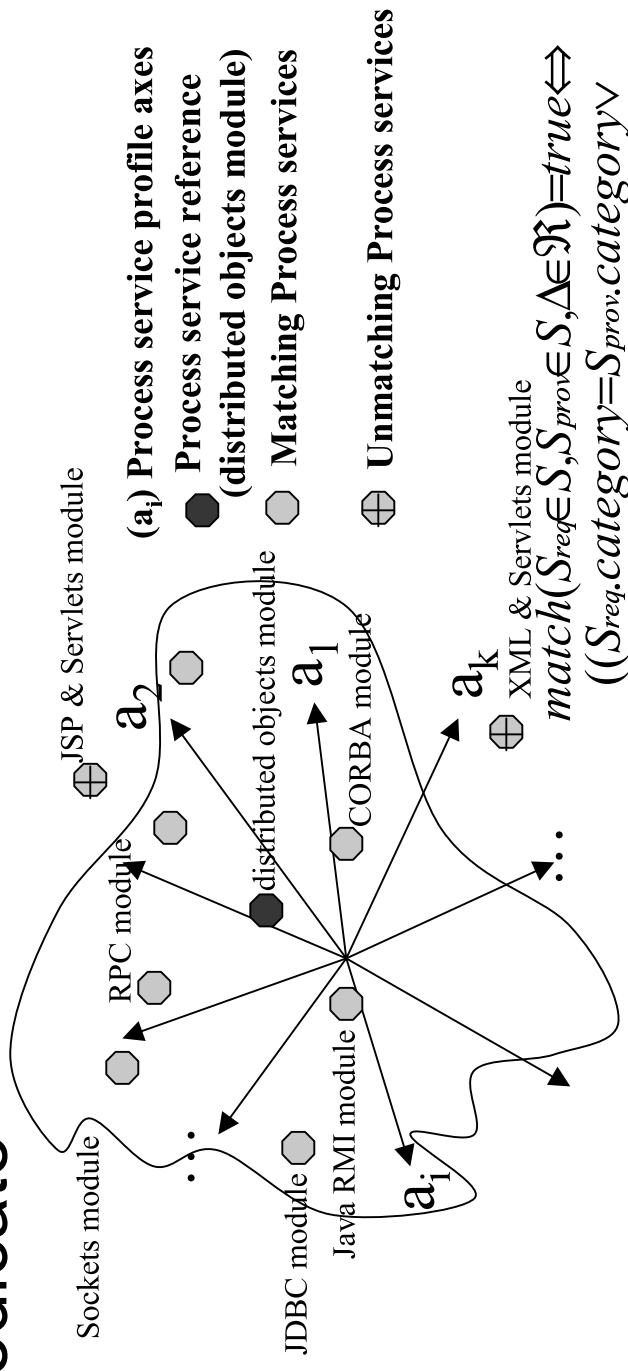
- A Category and Profile based Multidimensional Distance (detailing measures by profile axes)

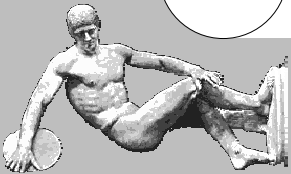




Semantic Visibility

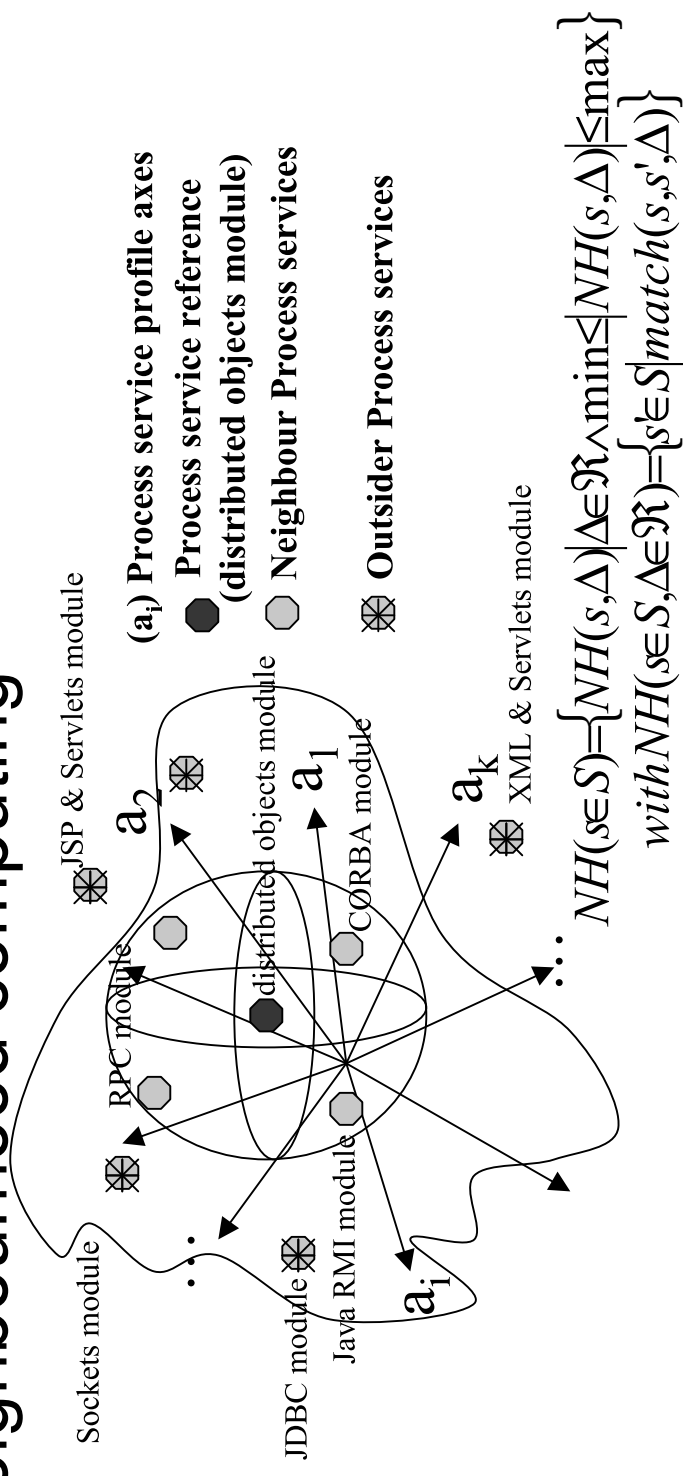
• A Category and Distance based Matching predicate

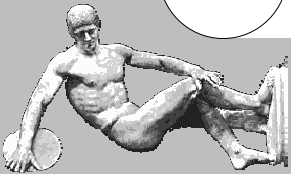




Semantic Visibility

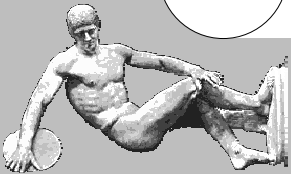
• A Matching and Distance based Neighbourhood computing





Functional Visibility

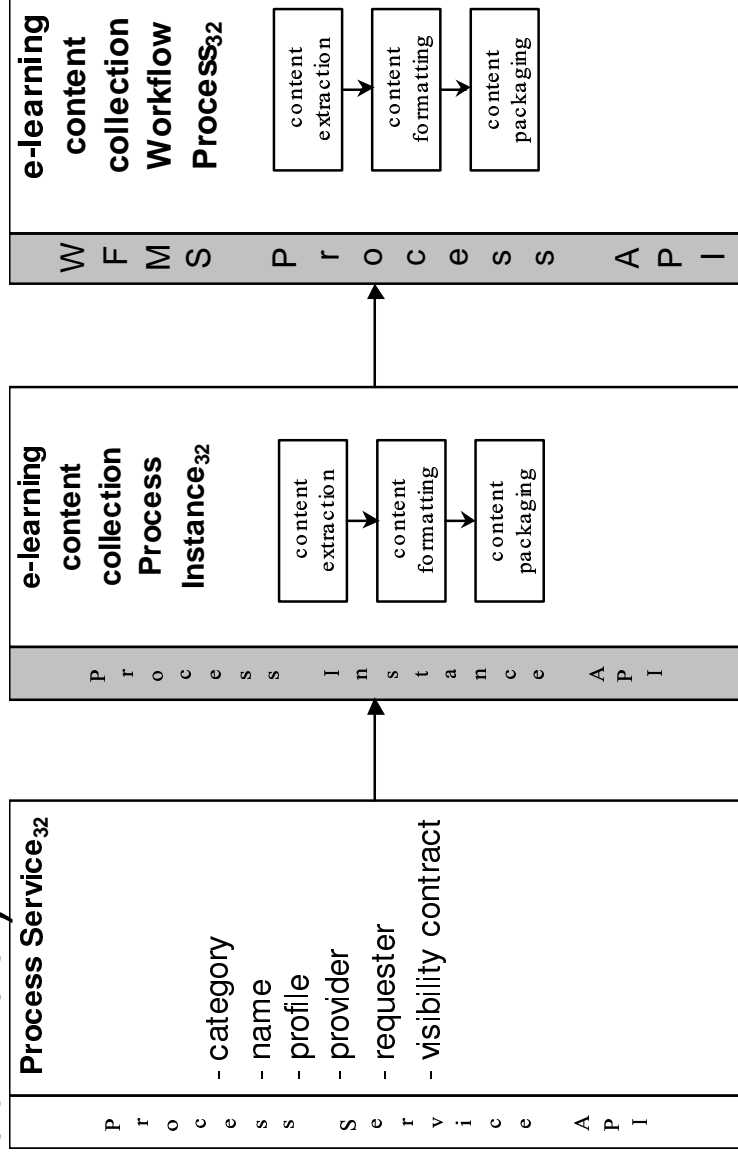
- Process Service API
 - Process Service Events,
 - Process Service Methods,
- Process Service API visibility contract
- Process Service Data spaces (in progress).



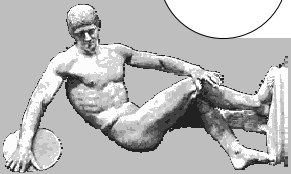
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Functional Visibility

- Process Service API (Methods, Events and API visibility contract)

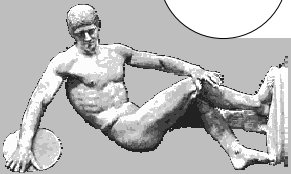


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Dynamics

- Co-Decision Problems :
 - previously unknown interconnection parameters
 - partners to be interconnected,
 - concrete process services to be exchanged,
 - communication protocol to be adopted,
 - interconnection exchange rendezvous, etc.

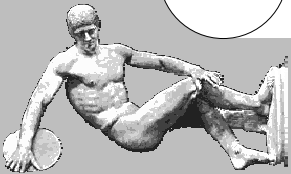


Dynamics

- Negotiation Mechanisms :

- application of “our generic negotiation model for CSCW”, M. Munier, K. Baïna and K. Benali, CoopIS’00

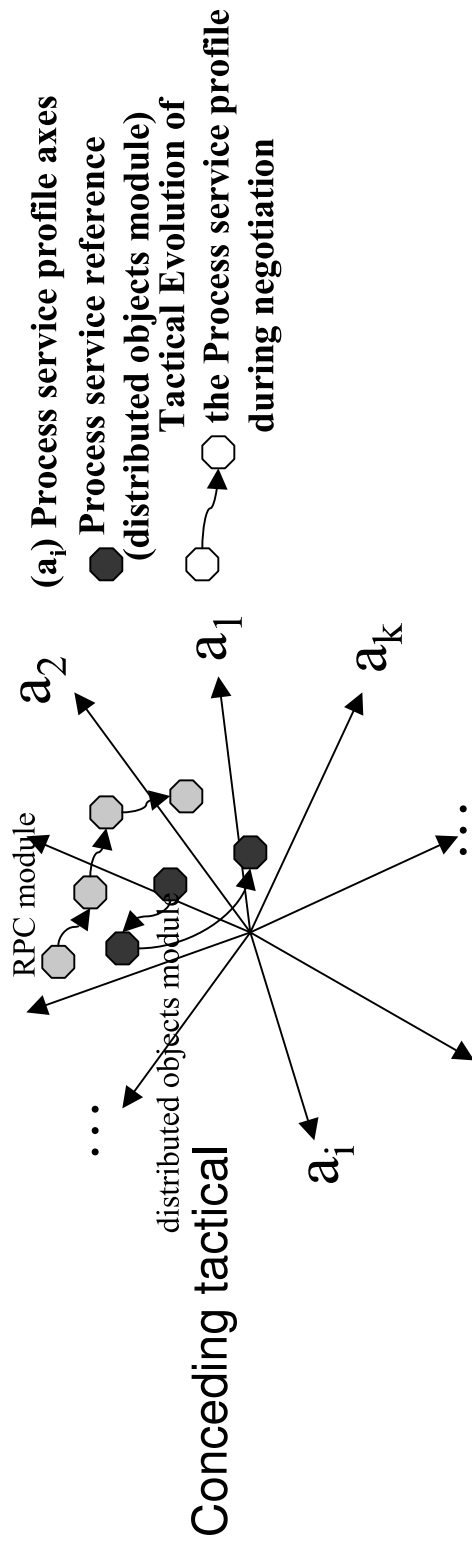
- Language : A speech act based Negotiation Language,
- Protocol : A transactional rule guided Protocol,
- Tactical : A methodology based on preference order relations between decision items.

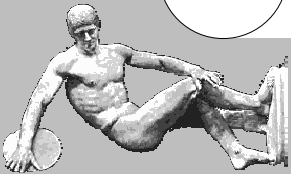


Dynamics

• Negotiation of Service Profile

- Language : speech acts + profile attributes
- Tactical : having less than a maximum distance

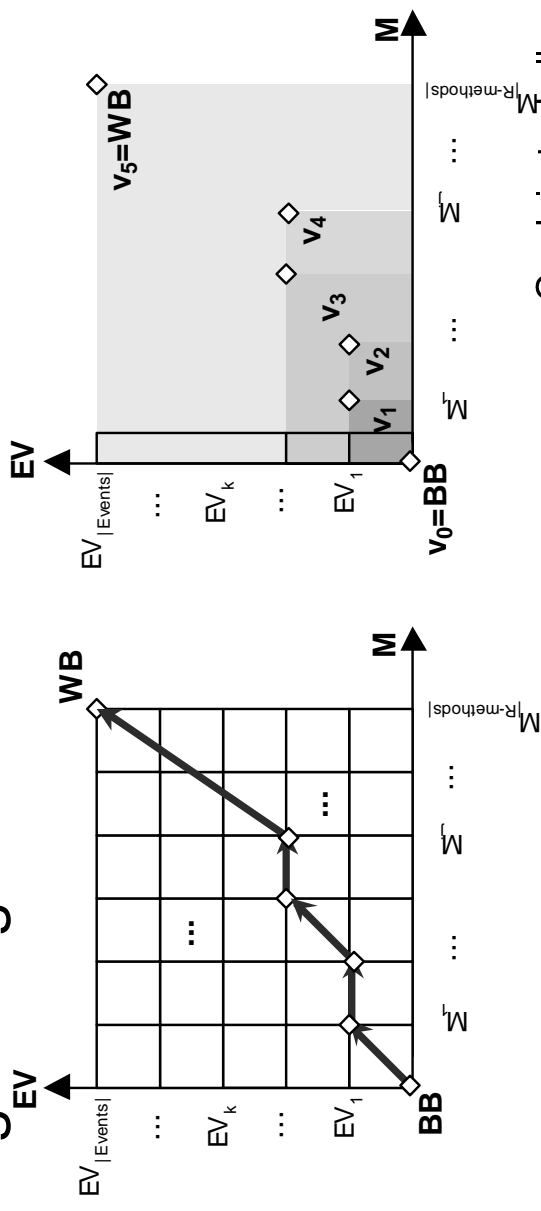


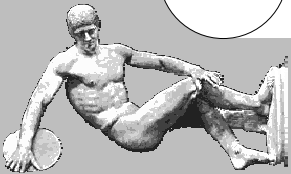


Dynamics

- Negotiation of Service API visibility contract
 - Language : speech acts + API (methods, events)
 - Tactical : progressing inside a contract set

Conceding tactical
Provider view



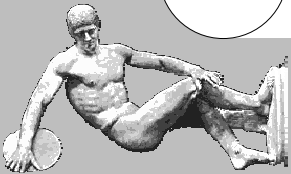


A generic process service interconnection Model – sum up

- Step 1 : creating and profiling process service,
- Step 2 : publishing process service (request/provide),
- Step 3 : process service neighbourhood computing,
- Step 4 : process service profile negotiation,
- Step 5 : process service API visibility contract negotiation,
- Step 6 : process service wrapping (contract signature),
- Step 7 : process service enactment,
- Step 8 : process service life cycle monitoring.

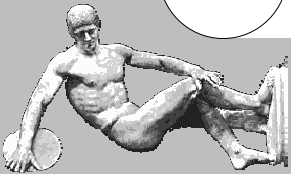
K. Baina

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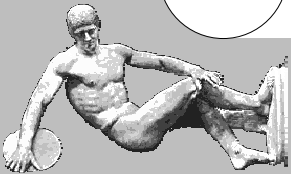
Model implementation in our CSCW plate-form DISCOBOLE

- DISCOBOLE as DIStributed COoperation and Business prOcess on LinE
 - CORBA based Negotiation Support System :
 - Generic NSS applied to Process Service Profile Negotiation, and to API visibility Negotiation
 - CORBA based Process Service Support System :
 - Private/Requested/Provided Process Service Spaces, Process Service Categorisation and Profiling, Matching Predicate, Neighbourhood Computing, Profile Negotiation, API visibility contract Negotiation, Wrapping, Enacting, etc.



Conclusion and Perspectives

- A generic process service interconnection model supporting **dynamics** and **visibility**
- In progress work
 - Process Service data spaces,
 - Process Service composing and coordination,
 - Process Service interconnection **coherence**.



Papers

- “A negotiation model for CSCW”, M. Munier, K. Baïna, and K. Benali, Cooperative Information Systems (CoopIS’00), September 2000, Eilat, Israel
- “A process service model for dynamic enterprise process interconnection”, K. Baïna, K. Benali, and C. Godart, (CoopIS’01), September 2001, Trento, Italy

Untitled

application espace privé de service services fournis services requis services fournis des partenaires services requis des partenaires mes négociations

espace de travail

service fournis

tous mes services fournis

services requis

tous mes services requis

Requested_e_learning_portal_service

espace privé de service

mes négociations de profil

toutes les négociations

mon service

Requested_e_learning_portal_service

Provided-e-learning_portal_service

E_learning_portal_developpement_service

Partenaire

E_learning_portal_developpement_service

historique de négociation

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sélectionnez une force illocutoire

Assertifs

Prohibitifs

Refuser

Expressifs

Directifs

Oui

Annuler

